



## **Waste flows from Chemours**

### Investigation into GenX emissions from waste processing

#### *Summary*

As a result of a motion from the Lower House (28089 no. 58/ session year 2017-2018), in which a request was made to provide insight into the destination of GenX-containing waste originating from Chemours, the Human Environment and Transport Inspectorate performed a qualitative investigation, in cooperation with the environment agencies concerned, into the processing of waste flows from Chemours and the emissions of GenX-chemicals into the environment during waste processing. To this end, Chemours and the waste processing companies concerned in the Netherlands were visited. This report contains the findings of the investigation that the Human Environment and Transport Inspectorate performed in cooperation with various competent authorities.

#### *GenX*

GenX is a technology used to make coatings. The fluorinated substances FRD-902 and FRD-903 play a role here. As part of this investigation, FRD substances are discussed in more detail below. The harmful effects of FRD substances are comparable with those of the substance of very high concern (SVHC), perfluorooctanoic acid (PFOA). At the beginning of this year, the National Institute for Public Health and the Environment (Rijksinstituut voor Volksgezondheid en Milieu (RIVM)) classified the two FRD substances as substances of potentially very high concern. FRD-902 and FRD-903 are deemed potentially carcinogenic. (RIVM, website, 2018)

#### *Legislative framework*

Regulations apply to waste disposal; the disposer of waste must provide information on the origin and composition of this waste. The waste processing companies have an EPA permit (Environmental Permitting (General Provisions) Act permit) which clearly states what control measures apply to the acceptance of waste chemicals. This also applies to the waste substances containing substances of very high concern (SVHC). The permits must comply with the National Waste Management Plan (NWMP). A framework for recycling waste containing substances of very high concern is outlined in National Waste Management Plan 3. The waste regulations do not comprise any specific obligations for FRD substances. FRD is included in the list of potential substances of very high concern. A provisional target value for drinking water and an advisory value for surface water has been formulated.

#### *Chemours*

Chemours indicated that it can recover up to maximum 40% of the FRD substances from its production process. According to Chemours, approximately 55% of the FRD substances pass into waste flows and the other 5% is emitted to air and water or forms a part of the finished product. Chemours determines whether a waste flow contains FRDs based on the production process. The Human Environment and Transport Inspectorate was unable to establish that Chemours has a conclusive procedure or decision matrix for this assessment. Chemours takes no measurements to determine whether FRD substances are in the waste. The waste substances' records of Chemours do not always show what the type and origin of the waste flows are. This led in one case to the discovery of a waste flow that evidently contained FRD substances, while they should not have been present based on the production process.

Chemours does not inform its waste processors about the presence of FRD substances in the waste flows, with the result that the waste processors do not know that the waste contains FRD substances.

#### *Waste processors*

The waste processors do not so far test the waste flows for the presence of FRD substances. The waste processors concerned are now aware of this situation, what has resulted in some waste processors no longer accepting the waste flows from Chemours.

The waste water of Chemours is purified by the waste processors and then often discharged to surface water. The processing method with which the waste processors treat the waste water has evidently proved inadequate for the removal of FRD substances which means that FRDs remain present in the discharged water and so end up in the surface water.

The contaminated soil of Chemours is thermally purified, washed or combined. The soil processors assume that the processing methods used by them do not remove FRD substances and that this sometimes results in contamination with FRD. FRD substances consequently remain in the soil and this soil is then deposited for use.

The processors visited are now aware of the fact that the waste processing techniques used are not effective in removing or destroying FRD substances in all cases. Only treating FRD-containing waste in a rotary kiln at a sufficiently high temperature can destroy the FRD substances. The Human Environment and Transport Inspectorate issued an (export) permit for the incineration of waste substances originating from Chemours in a rotary kiln in Belgium.

#### *Transport*

Transport companies deliver waste water from Chemours to waste processors. The transport companies do not as standard clean the tankers used for this and do not test for residual traces of FRD substances after their use. These vehicles may then be used to transport other (waste) flows, which may then become contaminated with FRD. The rinse water that is produced when cleaning may contain FRD substances. The cleaning companies discharge this rinse water into the sewer.

#### *Other FRD sources*

During an investigation at a waste processor, which did not receive waste from Chemours, FRD was detected in the waste flows. There may be sources of FRD substances other than just Chemours. However, this falls outside the scope of the investigation of the Human Environment and Transport Inspectorate.

### **Conclusion of the Human Environment and Transport Inspectorate**

#### *Attention for FRD substances*

The investigation showed that little or no attention is given to FRD substances in waste throughout the entire chain. At Chemours, the waste processors visited and the transport companies visited.

FRD substances are consequently emitted into the environment at various places in the chain. An overview of where and to what extent emissions into the environment occur cannot be provided at this time based on the information currently available.

Chemours bases its determination of the norm for FRD-containing substances in its waste on National Waste Management Plan 3 (Landelijk Afval Plan (LAP 3)). However, the Chapter involved concerns a policy framework for recycling waste containing substances of very high concern. This plan is not an Act or Decree that has a direct effect. Further notable is that no attention was given for FRD substances in any of the environmental or discharge permits of the waste processors visited.

A legislative framework is (largely) absent; until recently, there was not even a system of standards for the FRD substances (GenX). The FRD substances have not yet been classified as substances of very high concern and the waste policy for (potential) substances of very high concern is very recent and must still be developed further.

### *Duty of care*

On the basis of the fact that FRD substances were recently added to the list of potential substances of very high concern and their possible harmful impact on living creatures and the environment, all parties in the chain should be expected to take measures to prevent emissions into the environment. This follows from the duty of care provisions of the Environmental Management Act and with that stands separate from the absence of standards.

### **Reflection by the Human Environment and Transport Inspectorate**

In this paragraph, the Human Environment and Transport Inspectorate responds to important results of the investigation.

#### *Compliance with the duty of care and preventing diffuse pollution*

Based on the diffuse pollution and with that the possible negative impact on the environment, the Human Environment and Transport Inspectorate believes that measures must be taken to prevent and limit the harmful effects. Chemours does not say that its waste or products contain FRD substances; this should be indicated. They can, after all, have negative consequences for the soil, groundwater, surface water (when discharged from the (waste) processing process) and possibly for the drinking water to be sourced from it. This follows from the duty of care provision of the Environmental Management Act and with that stands separate from the absence of a norm or assessment framework. FRD substances can also be used by other companies and FRD-containing products or waste flows are traded, dispensed of, discharged or emitted; that is apparent from the information on the discharges of the waste processors and from Chapter 7. The same applies to these companies. On the basis of the fact that FRD substances were recently added to the list of potential substances of very high concern and their possible harmful impact on living creatures and the environment, all parties in the chain should be expected to take measures to prevent and limit their harmful effects on the air, soil, groundwater, surface water and possibly on the drinking water to be sourced from it.

Research has shown that the release of FRD-containing waste adversely impacts the environment. FRD has been found in surface water which puts drinking water at risk of contamination. It is possible that surface water is contaminated as a result of transporting waste water, cleaning tankers and product use. There is no clear communication on the FRD levels in the waste substances and product. This is apparent from Chemours<sup>1</sup> waste descriptions and from the information from the waste processors and transporters.

Chemours is aware of the pertinence of sharing this information as the company must make the necessary efforts at its own plant to reduce FRD discharge into the waste water and emissions into the air. The company possesses knowledge on the behaviour of FRD during waste water purification and air treatment and the consequences thereof for the discharges or emissions. The fact that FRD has been included on the list of potential substances of very high concern emphasizes the need to speak to the company on preventing emissions as much as possible, and this also includes further along the (waste) chain.

### **System of standards and waste processing**

The waste processors do not feel the need to ask for information on FRD substances when accepting waste substances. Regulations that should regulate this are currently absent in the permit. Consequently, disposers are not actively questioned about these substances and they feel insufficiently responsible for disclosing such information.

<sup>1</sup> The National Institute of Public Health and Environmental Protection indicated that both use the same human toxicological information and both account for the contribution of other sources. The European Water Framework Directive (WFD) method accounts for fairly high consumption of fish by humans and, because this substance accumulates in fish, the fish consumption route weighs greater than the consumption of drinking water. That is the reason why the norm for surface water is stricter than the drinking water norm.

At this moment, the only FRD norm is the provisional drinking water norm of 150 ng/l. Very recently, the Minister of Infrastructure, Public Works and Water Management published advice for a provisional value for surface water of 118 ng/l. The last norm will be used by the water quality management body to calculate the FRD level in waste water before discharge.

The waste legislation does not set a norm, but Chemours and some waste processors refer to the 0.1% approach for substances of very high concern in National Waste Management Plan 3 (Landelijk Afval Plan (LAP 3)). This approach involves performing a risk assessment by a concentration of substances of very high concern of - in principle - above 0.1% with the aim of recycling waste substances in a way that is responsible for living creatures and the environment. It could then be said, according to these companies, that the risks can be deemed sufficiently acceptable under 0.1% and that additional measures are therefore not necessary.

That is an incorrect interpretation. In the first place, National Waste Management Plan 3 (Landelijk Afval Plan (LAP 3)) is a policy framework and not an Act or Decree; there is no direct effect, just an assessment framework for the issue of a permit.

In addition, Chapter B14 of the National Waste Management Plan 3 (Landelijk Afval Plan (LAP 3)) covers the rules for granting permission for recycling waste substances, in the scope of the circular economy. There is no question of this in the case of the FRD-containing waste flows from Chemours; they must be disposed.

This presents a problem for the environment, as the level of FRD may increase to 0.1% (=1,000,000,000 ng/l) in the eyes of Chemours and some Waste processors. This, in any case, results in (many more) problems for the water quality management bodies with respect to sewage treatment and drinking water supply, as it is known that current processing in the Netherlands does not effectively remove FRD. Only incineration in a rotary kiln appears capable of destroying FRD.

Whether at the insistence of the appropriate authorities or not, some waste processors have introduced a new criterion which the to-be-accepted liquid waste must satisfy. This differs per case. Sometimes this is directly based on the provisional drinking water norm of 150 ng/l; in other cases the analysis problems are accounted for and 1000 ng/l is applied.

#### *FRD-containing waste from Chemours*

To the present date, Chemours has not systematically and substantially identified which waste flows contain FRD. The waste substances' records of Chemours do not always show what the type and origin of the waste flows are.

By the start of its own independent business activities in the middle of 2015, Chemours did not apply for a new company number for reporting to the LMA. Consequently, their own waste records with their own waste registration numbers could not be started.

The FRD-containing waste flows are determined by Chemours based on the production process and general chemical characterization and not on analysis. This process is not conclusive. It is even the case that FRD can be present in unexpected flows, as evidenced by the process waste water of the Viton™-factory.

Information from LMA and investigations at the waste processors showed that the company name of Chemours is not consistently used for the waste flows of Chemours. Various legal entities appear to be used (registered at the same address). After it became known that certain waste flows contain FRD, no (new) separate waste registrationflow numbers have been requested.

Consequently, providing a quantitative picture of the FRD-containing waste flows or insight into the 'most important' FRD-containing flows has not proved possible. However, it has been determined that not all FRD-containing waste were disposed by incineration, contrary to that indicated by Chemours.

#### *Role of the competent authorities*

Expectations are that FRD substances will need to be addressed in the immediate future. This can focus on waste processors, but it must also involve identifying other emission sources of FRD

substances. This requires the commitment of the competent authorities to have these activities performed by the implementing agencies.

The various regional implementing agencies as representatives of the competent authority and the water quality management bodies provided their cooperation during the investigation. Cooperation and information exchange is important in cohesively shaping the approach to the problems on a larger scale. The permits of the relevant waste processors must be amended in accordance with National Waste Management Plan 3 (Landelijk Afval Plan (LAP 3)), but also with regard to the substances of very high concern.

Finally, the Human Environment and Transport Inspectorate, in its role as legal adviser on EPA permit issuance, will advise the competent authority on the permit to be issued to, among others, Chemours where emissions of FRD substances and (potential) substances of very high concern form an important aspect.

This is a publication by the

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